

**ASBESTOS-CONTAMINATED SOIL MANAGEMENT
STANDARD OPERATING PROCEDURE
For City and County of Denver**

December 3, 2010



City and County of Denver
Department of Environmental Health
Division of Environmental Quality
200 West 14th Avenue, Department 310
Denver, Colorado 80204
311

**ASBESTOS-CONTAMINATED SOIL MANAGEMENT STANDARD
OPERATING PROCEDURE
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December 3, 2010

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Table of Contents

ACRONYMS.....	III
DEFINITIONS.....	IV
1 INTRODUCTION.....	1
2 SITE INFORMATION, CONDITIONS AND PLANNED SOIL DISTURBING ACTIVITIES.....	2
2.1 SITE INFORMATION BACKGROUND.....	2
2.2 REVIEW OF ENVIRONMENTAL AND HISTORICAL CONDITIONS.....	2
2.3 ACS POTENTIAL CLASSIFICATION	2
2.3.1 Known ACS.....	2
2.3.2 Reason to Believe.....	3
2.3.3 No Reason to Know or Believe	3
3 PRIMARY CONTACTS, ROLES AND RESPONSIBILITIES	5
3.1 ASBESTOS BUILDING INSPECTOR REQUIREMENTS.....	5
3.2 CONTRACTOR REQUIREMENTS	6
4 REGULATORY SUMMARY AND REGULATORY REFERENCES	7
4.1 CDPHE HAZARDOUS MATERIALS WASTE MANAGEMENT DIVISION (HMWMD) – “ASBESTOS- CONTAMINATED SOILS” NOT ASSOCIATED WITH THE “BUILT ENVIRONMENT”	7
4.2 FEDERAL AND STATE AGENCIES	8
4.3 FACILITY COMPONENTS	8
5 TRAINING REQUIREMENTS.....	10
5.1 SOP CIRCULATION	10
5.2 AWARENESS TRAINING	10
5.3 ACS SOIL DISTURBANCE TRAINING.....	10
5.4 ACS INSPECTION, SOP PREPARATION, AND AIR MONITORING TRAINING	11
5.5 ADDITIONAL CONSIDERATIONS.....	11
6 IMMEDIATE AND INTERIM ACTIONS UPON DISCOVERY OF SUSPECTED ACM	12
6.1 IMMEDIATE ACTIONS UPON DISCOVERY OF SUSPECTED ACM.....	12
6.2 INTERIM ACTIONS UPON DISCOVERY OF SUSPECTED ACM.....	16
6.2.1 Site Characterization.....	16
7 REMOVAL OF ASBESTOS-CONTAMINATED SOIL	17
7.1 ACS MANAGEMENT PROCEDURES.....	17
7.1.1 Minimum Engineering Controls for Known or Reason to Believe Sites.....	17
7.2 NOTIFICATIONS FOR PLANNED ACS OR ACM DISTURBANCE.....	17
7.3 REMOVAL BY HAND - LIMITED QUANTITY ACM DISCOVERY MANAGEMENT AND DISPOSAL “PICK AND Go”	17
7.4 EXCAVATION AND EARTHMOVING, KNOWN ACS OR ACM.....	18
7.4.1 Site Control, Demarcation, Fencing and Wind Screening.....	18
7.4.2 Protection of Adjacent Structures.....	18
7.4.3 Soil Wetting and Stabilization.....	19
7.4.4 Dust and Emissions Control	19
7.4.5 Personal Protective Equipment	19
7.4.6 Removal/Excavation	19
7.4.7 Soil Stockpiling.....	20
7.4.8 Truck/Container Staging/Lining and Waste Loading	20
7.4.9 Waste Transportation and Disposal	21

7.4.10	Personnel Decontamination.....	22
7.4.11	Equipment Decontamination.....	22
7.5	WIND AND WORK STOPPAGE CONDITIONS.....	22
7.6	AIR MONITORING REQUIREMENTS ASSOCIATED WITH ENGINEERING CONTROLS	23
7.6.1	Personal Air Monitoring Associated with OSHA.....	23
7.6.2	Perimeter Air Monitoring	24
7.6.3	Air Sample Analysis.....	24
7.6.3.1	Sampling Media.....	24
7.6.3.2	Sample Analysis	24
7.6.3.3	Reporting	24
7.7	FINAL INSPECTION PROCEDURES.....	25
7.8	MANAGING ACS LEFT IN PLACE.....	25
7.9	SPILL CONTROL.....	25
7.10	EROSION CONTROL	25
8	SPECIAL CONSIDERATIONS.....	26
8.1	IMPORTING AND EXPORTING SOIL	26
8.2	SOIL STOCKPILING MANAGEMENT PROCEDURES.....	26
8.3	EMERGENCY BURIED UTILITY REPAIR PROJECTS.....	26
9	REFERENCES.....	27

TABLES

Table 1: Air Monitoring Requirements

FIGURES

Figure 1: Site Review and ACS Potential Classification Flowchart

Figure 2: Unanticipated Discovery of Asbestos in Soil Flowchart

APPENDIX A

CDPHE Notification Forms

APPENDIX B

CDPHE Approval letter and City's Responses to CDPHE Comments

ACRONYMS AND DEFINITIONS

Acronyms

ABI	Asbestos building inspector
ACM	Asbestos-containing materials
ACS	Asbestos-contaminated soil
AMS	Asbestos Air Monitoring Specialist, CDPHE Certified
APCD	Air Pollution Control Division
AQCC	Air Quality Control Commission
CCOD	City and County of Denver
CDPHE	Colorado Department of Public Health and Environment
City	City and County of Denver
DADS	Denver Arapahoe Disposal Site
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
GIS	Geographic information system
GPS	Global positioning system
HASP	Health and Safety Plan
HEPA	High efficiency particulate air
HMWMD	Hazardous Materials Waste Management Division
MMP	Materials Management Plan
MPH	Miles per hour
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NVLAP	National voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PCM	Phase Contrast Microscopy
PEL	Permissible Exposure Limit
PLM	Polarized Light Microscopy
POLY	Polyethylene
PPE	Personal Protective Equipment
SCMP	Soil Characterization and Management
SOP	Standard operating procedure
TEM	Transmission electron microscope
TSCA	Toxic Substances Control Act

Definitions

"Air Monitoring Specialist" means a person who performs air monitoring referred to in this guidance and who is certified to perform air monitoring in accordance with Air Regulation No. 8, Part B.

"Asbestos Supervisor" means a person who has been certified as an asbestos Supervisor in accordance with Air Regulation No. 8, Part B.

"Asbestos Project Designer" or **"Project Designer"** means a person who has been certified as an asbestos Project Designer in accordance with Air Regulation No. 8, Part B.

"Adequately wet" means sufficiently mix or penetrate with liquid to completely prevent the release of particulate material and fibers into the ambient air. If visible emissions are observed coming from asbestos-contaminated soil or asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet. Guidance on determining when a material is adequately wet can be found in EPA's *Asbestos NESHAP Adequately Wet Guidance*, EPA 340/1-90-019 (December 1990).

"Asbestos" means the asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite), amosite (cummingtonite-grunerite), anthophyllite, and actinolite-tremolite.

"Asbestos contaminated soil" means soil containing any amount of asbestos.

"Asbestos waste" means any asbestos-containing material whether it contains friable or non-friable asbestos, that is not intended for further use. This term includes but is not limited to asbestos mill tailings, asbestos from pollution control devices, and containers that contain asbestos.

"Asbestos containing material" means any material that contains more than one percent (1%) asbestos by weight, area or volume.

"Certified Asbestos Building Inspector" (ABI) means a person certified in accordance with Air Regulation No. 8, Part B, to perform asbestos inspection and sampling, and who has a minimum of six (6) months experience in asbestos-contaminated soil inspections.

"Consultant" means entity contracted to perform training, inspections, and air monitoring related to soil disturbing activities in accordance with the SCMP.

"Contractor" means entity contracted to perform soil disturbing activities in accordance with the SOP.

"Facility Component" means any component associated with a structure, installation, or building and includes buried utilities, tanks, structures or other installations.

"Friable" means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously non-friable material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

"Leak tight" means that solids, liquids, or gases cannot escape or spill out. It also means dust tight.

"Mechanical" means operated or produced by mechanism or machine. This may include, but shall not be limited to, an excavator, backhoe, grader, tiller, auger, or hand shovel.

"Non-friable" means material which, when dry, may not be crumbled, pulverized, or reduced to powder by hand pressure.

"Site" or **"solid waste disposal site"** means the location for a facility chosen based upon geologic, hydrogeologic and operational considerations. For the purpose of Section 5.5 of the Solid Waste Regulations "site" means the area or areas where soil-disturbing activities are occurring or will occur.

"Soil-disturbing activities" means excavation, grading, tilling, or any other mechanical activity used to disturb the soil.

"Visible emissions" means any emissions which are visually detectable without the aid of instruments, coming from material containing asbestos, asbestos waste, asbestos-contaminated soil, or from handling and disposal of asbestos waste, material containing asbestos or asbestos-contaminated soil.

"Work Area" means the area where soil disturbing activities are occurring. For asbestos contaminated soil disturbance, Work Area also means the regulated/controlled area boundary.

Purpose and Scope

1 Introduction

This Standard Operating Procedure (SOP) provides written procedures that are the minimum requirements for the proper training, handling, packaging and disposal of asbestos-contaminated soil (ACS) or asbestos containing material (ACM) during soil disturbing activities for City and County of Denver (City) properties or property owned by others where the City is performing work. This SOP shall be followed whenever soil excavation or disturbance will occur in areas where ACS or ACM is known or suspected to exist. This SOP satisfies the Section 5.5.3(C) and 5.5.4(B): Soil Characterization and Management Plan Requirements of the Colorado Solid Waste Regulations (6CCR 1007-2, Part 1).

When using this SOP for a specific project, appropriate notification shall be provided to the Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (CDPHE) using the CDPHE notification forms attached to this SOP (Appendix A). Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Appendix A may not be necessary.

This SOP should be used as a guideline for implementing appropriate management and disposal practices, and may be supplemented with additional site-specific addendums which describe current site conditions and past characterization efforts. In addition, site-specific management plans, Material Management Plans (MMPs) for other regulated material, and/or Health and Safety Plans (HASPs) for site-specific safe work practices will be appended to this SOP when appropriate. Such addendums and management plans will be submitted to the CDPHE using the same CDPHE notification requirements noted above.

CDPHE has reviewed, commented on earlier version and has approved this SOP. The CDPHE Letter approving this SOP is included in Appendix B. Appendix B also includes the City's responses to CDPHE comments on an earlier draft version of this SOP.

2 Site Information, Conditions and Planned Soil Disturbing Activities

2.1 Site Information Background

Knowledge of potential or known asbestos in soil occurrence is gained through a review of environmental and historical conditions of a site, or prior site characterizations, investigations or assessments. Results of the environmental and historical review will be used to classify the site according to the potential for asbestos to be present in soil, and the appropriate level of response, characterization and management activities, if any, for a site.

2.2 Review of Environmental and Historical Conditions

A review of environmental and historical conditions may consist of a Phase I Environmental Site Assessment (ESA), or a less formal environmental screen. The review may include, as necessary:

- Historical aerial photographs;
- Sanborn Fire Insurance maps;
- Historical city directories;
- City and County of Denver historical landfill map and database;
- Standard environmental record sources;
- Site visit;
- Utility plans and maps;
- Previous environmental studies;
- Building department records;
- County assessor's office records;
- Geologic maps;
- Investigation of other historical site conditions and uses;
- Interviews with site owners, operators, and government officials.

2.3 ACS Potential Classification

Results of the environmental and historical review are used to classify the site according to the potential for asbestos to be present in soil. The classification is used to determine the appropriate level of response, characterization and management activities, if any, for a site. Figure 1 depicts the site classification system and the response actions that flow from each classification.

2.3.1 Known ACS

A site that is classified as having known ACS is one where confirmed asbestos material in the soil was identified from subsurface soil investigation or from visual observations of the surface, sidewalls, embankments, etc. Soil disturbance activities on sites with known ACS will follow the management practices outlined in Section 7.0 of this SOP. Additional site characterization, if appropriate, will be conducted according to the procedures outlined in Section 6.0 of this SOP.

2.3.2 Reason to Believe

A site that is classified as Reason to Believe is one where evidence from environmental and historical reviews indicates that ACM could be encountered. Such evidence could include the presence of buried building debris or landfills in which construction debris or ACM is believed to have been deposited. Soil disturbing activities on sites classified as Reason to Believe will follow management practices of Section 7 of this SOP.

The presence of the following materials alone would not justify classifying a site as Reason to Believe:

- Wood
- Glass
- Metal
- Gravel
- Unfinished (no surface coating) concrete slab¹
- Brick – other than fire brick²

Brick and concrete typically are considered to be free of asbestos and rarely or only occasionally will contain asbestos. If ACM is identified in these or other materials the appropriate management practices outlined in Section 7.0 of this SOP will be implemented during soil disturbing activities. Additional site characterization, if appropriate, will be conducted according to the procedures outlined in Section 6.0 of this SOP.

2.3.3 No Reason to Know or Believe

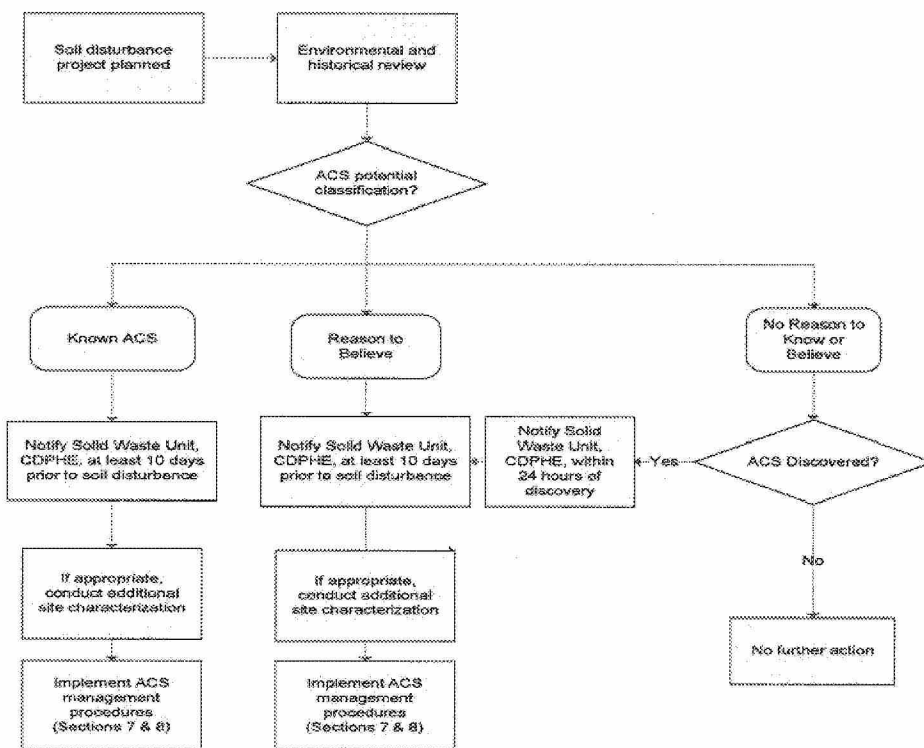
A site that is classified as having No Reason to Know or Believe is one where environmental and historical reviews do not identify the potential for asbestos containing materials to be on site even though waste material identified above and not typically associated with asbestos may be present.

Procedures in Section 7.0 of this SOP would not be implemented at a site classified as No Reason to Know or Believe.

¹ Addition of asbestos to concrete slab was not a common use of asbestos. However, manufactured asbestos and Portland cement products were common including water pipes, simulated ceramic bathroom tiles, facings of acoustical materials, electrical switchboard panels, laboratory tabletops, electrical conduits, and even smaller diameter pipes were used for purlins and trusses in wartime construction to conserve steel and lumber.

² Asbestos was historically used in the fabrication of fire brick. Asbestos containing fire brick was used around boilers and furnaces and was cemented in place with asbestos furnace cement. Today, fire brick is manufactured without asbestos and much of the older asbestos fire brick has been removed and replaced with non-asbestos fire brick. Discussion of fire brick will be included in City-provided asbestos awareness training.

Figure 1. Site Review and ACS Potential Classification Flowchart



3 Primary Contacts, Roles and Responsibilities

For projects where asbestos in soil will be disturbed, personnel from the following departments and agencies will be identified for each site.

<i>Organization</i>	<i>Role/Responsibility</i>	<i>Contact Information</i>
City and County of Denver Specific Division	Project Management	To be determined
City and County of Denver Department of Environmental Health	Environmental Compliance	Steve Gonzales Phone: 720.865.5447 Email: steve.gonzales@denvergov.org
CDPHE Hazardous Materials and Waste Management Division (HMWMD)	Regulatory Agency	CDPHE Project Manager Solid Waste Unit Phone: Email:
Excavation Contractor	Site excavation and as needed management of ACS in accordance with this SOP	To be determined
ACS Consultant	ACS Consulting (soil characterization, remediation oversight, soil observation, ACM identification and air monitoring)	To be determined

Additionally, an asbestos building inspector certified in accordance with Air Regulation No. 8, Part B with at least six months of asbestos in soil experience (ABI) will be selected and independently retained by the excavation contractor. Requirements and responsibilities of the ABI, excavation contractor (contractor) and ACS consultant are discussed in the following subsections.

3.1 Asbestos Building Inspector Requirements

At sites classified as "Known ACS" or "Reason to Believe" where one could reasonably expect to encounter ACM an ABI will be on-site during soil disturbing activities to observe and identify potential ACM which may be encountered.

The ABI will be responsible for the following:

- Be on-site during soil disturbing and soil loading operations;
- Identify suspect ACM as soil is being excavated;
- Complete necessary sampling of suspect ACM in accordance with Section 6.1 of this SOP;
- Complete daily logs detailing site activities;
- Maintain pertinent documentation related to adherence of the SOP, including sampling results, air monitoring data, waste manifests, photographs, etc., and
- Verify implementation and adherence of the SOP in the event that ACM is identified during excavation of soil at the site.

3.2 Contractor Requirements

Contractors performing ACM or ACS removal activities will be responsible for the following:

- Providing the ABI and the City with documentation that all individuals performing ACM or ACS disturbing activities have completed asbestos contaminated soil awareness training that provides information necessary to perform their duties in a way that ensures compliance with the requirements of Section 5.5 of the Solid Waste Regulations, Section 5.0 of this SOP, and asbestos awareness training per Occupational Safety and Health Administration (OSHA) standards set forth at 29 CFR 1926.1101 (k) (9) (vii). All records that document the training, experience or certification requirements required in Section 5.5 of the Solid Waste Regulations shall be available for Division review throughout the duration of ACM or ACS disturbing activities;
- Preparing and implementing a HASP in accordance with all applicable regulations, including OSHA. The contractor will be responsible for the health and safety of its employees, sub-contractors, consultants, etc., as well as providing all necessary training and personal protective equipment (PPE) for completion of work at the site;
- Maintenance of all necessary site control to prevent unauthorized entry into any regulated work area;
- Verifying that ACM or ACS disturbance-related waste material is not disposed on the site, disposed into storm drains, sanitary sewers, streams, irrigation facilities or waterways;
- Removing non-salvageable, non-hazardous materials and equipment from the site and disposing at DADS in accordance with local, state and federal laws;
- Ensuring that all special personnel and required equipment are provided to haul construction debris to DADS;
- Ensuring that any special handling charges imposed by Waste Management at DADS are paid; and
- The contractor will be responsible for adherence to this plan at the direction of the ABI.

4 Regulatory Summary and Regulatory References

4.1 CDPHE Hazardous Materials Waste Management Division (HMWMD) – “Asbestos-Contaminated Soils” not associated with the “Built Environment”

To address asbestos in soil, the CDPHE HMWMD has established specific management requirements for asbestos in soil under Section 5.5 of the Regulations Pertaining to Solid Waste Disposal Sites and Facilities (6 CCR 1007-2). Disposal of ACM, and work done in ACS, must comply with this regulation. The requirements of Section 5.5 of the Solid Waste Regulations apply to the owner or operator of any property with ACS at which soil-disturbing activities are occurring or planned for any area containing ACS. The requirements of Section 5.5 are triggered when the owner or operator knows of or believes ACS is present at a site, (through confirmation by analysis of observed material that is suspected of containing asbestos), or has reason to know or believe that visible asbestos will be encountered. An owner or operator who has no reason to know of or suspect ACS at a site does not have a duty to sample or otherwise investigate for ACS prior to commencing excavation, or other soil disturbing activities, at the site. It is important to understand that there is no language in the Solid Waste Regulations that requires an owner or operator to perform soil-disturbing activities, or to remediate ACS. The regulations include specific requirements that apply if ACS is disturbed or will be disturbed.

To supplement the regulation, CDPHE developed a guidance document intended to provide direction to contractors, consultants and property owners who are involved in soil disturbing activities in areas with known or suspected ACS, or where ACS is discovered. The guidance is meant to assist in compliance with the Solid Waste Regulations, and where applicable, Air Quality Control Commission Regulation No. 8, Part B (5 CCR 1001-10, Part B - Asbestos).

In accordance with Section 5.5.2 of the Solid Waste Regulations, the following projects are exempt from the requirements of Section 5.5 of the Solid Waste Regulations, but may be subject to other sections of the Solid Waste Regulations or other regulatory programs:

1. In situations where the soil contains solely non-friable ACM, that has not been rendered friable, the non-friable material can be removed from the soil and properly disposed in accordance with Section 5.2 of the Solid Waste Regulations. The surrounding soil would not be considered to be ACS, and therefore would not be subject to the requirements of Section 5.5 of the Solid Waste Regulations. The determination that a material is non-friable must be made by an ABI who has been certified in accordance with AQCC Regulation No. 8, Part B, and who has a minimum of six (6) months experience in ACS inspections (see Section 5.4 Worker Training).
2. The requirements of Section 5.5 of the Solid Waste Regulations do not apply to asbestos abatement of facility components (including pipes, ducts and boilers) conducted in accordance with AQCC Regulation No. 8, Part B, unless the total quantity of asbestos-containing material to be removed from a facility component that is on or in soil that will be disturbed falls below Regulation No. 8 trigger levels. Disposal of asbestos must comply with Sections 5.1 through 5.4 of the Solid Waste Regulations.

3. The requirements of Section 5.5 of the Solid Waste Regulations do not apply to spill response activities that are subject to the requirements of AQCC Regulation No. 8, Part B. As above, disposal of asbestos must still comply with Sections 5.1 through 5.4 of the Solid Waste Regulations.
4. Ambient occurrences of asbestos that are not due to site-specific activities. Ambient occurrences of asbestos may include, but are not limited to, naturally occurring asbestos or the distribution of asbestos from normal wear of automotive products.
5. Projects involving excavations with a total volume of less than 1 cubic yard of soil using low-emission excavation methods such as hand held tools or light equipment.
6. Projects conducted directly by a homeowner at their primary residence, including residential landscaping projects and other private residential soil-disturbing projects conducted after the primary dwelling is built, (e.g., planting trees, digging holes for fence posts, installing sign posts, gardening, or other projects done by private individuals at their primary residence.

The exemption for asbestos abatement projects conducted under AQCC Regulation No. 8, Part B includes asbestos debris that may come into contact with soil during demolition of structures with ACM and materials containing trace amounts of asbestos (including trace soil in crawlspaces, loose fill vermiculite, etc) that can legally remain during demolition and be disposed of as normal demolition debris. Any asbestos debris left behind after the completion of a demolition project and associated site cleanup would be subject to the requirements of Section 5.5 of the Solid Waste Regulations if disturbed in the future.

4.2 Federal and State Agencies

The EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPs)/CDPHE Air Pollution Control Division (APCD) regulations primary consideration under this SOP is adherence to CDPHE Regulation 8 requirements for the discovery of ACM on buried facility components such as piping, boilers, etc and the proper removal in accordance with the EPA NESHAPs and CDPHE Regulation 8. Under CDPHE Regulation 8, secondary consideration under this SOP is the proper removal of all construction debris including non-friable materials allowed to remain during demolition, asbestos containing joint compound (where composite result reported less than 1%) and trace-1% asbestos materials. Where demolition debris is allowed to remain after demolition activities have been completed, any presence of asbestos in the soil would then be subject to the CDPHE HMWMD ACS regulations outlined in 6 CCR 1007-2 Section 5.5.

All work on ACM or ACS must comply with the applicable requirements of EPA, OSHA, DOT and CDPHE Regulation 8.

4.3 Facility Components

Removal of ACM on a facility component with asbestos quantities above the following trigger levels is subject to the notification, permit, and abatement requirements of AQCC Regulation No. 8, and shall not be conducted under this SOP:

- i. 260 linear feet on pipes;

- ii. 160 square feet on other surfaces, or;
- iii. The volume equivalent of a 55-gallon drum.

However, removal of asbestos-containing material on a facility component, that is below the AQCC Regulation No. 8 trigger levels, and that is located on or in soil that will be disturbed, shall be conducted under this SOP in accordance with work practices in AQCC Regulation No. 8, Part B, Section III.O. This removal is not subject to the notification or permit requirements of Air Regulation No. 8; and OSHA Asbestos Standard for the construction Industry, 1926. 1101.

If there is asbestos-contaminated soil associated with the facility component, and less than one cubic yard of ACS will be disturbed, no notification will be made to CDPHE HMWMD. The subject ACS will be managed and removed utilizing wet methods and low-emission excavation techniques (hand tools). The CABI will ensure proper disposal of this ACS in accordance with Section 7.4.9 of this SOP.

If there is asbestos-contaminated soil associated with the facility component, and greater than one cubic yard of ACS will be disturbed, CDPHE HMWMD will be notified and the requirements in this SOP will be fully implemented.

5 Training Requirements

5.1 SOP circulation

Entities/persons involved with soil disturbing activities shall be provided a copy of this SOP prior to performing work.

5.2 Awareness Training

On-the-job asbestos soils awareness training as defined in Section 5.5.6 of the Solid Waste Regulations will be provided to all workers directly involved in soil disturbing activities on soil disturbing projects, including heavy equipment operators where there is known ACS or a reason to believe ACS may be encountered. The City's Department of Environmental Health, Environmental Quality Division (EQ) is available to any City department and/or City contractor as an ABI resource to provide the awareness training as follows:

"On-the-job" asbestos soils awareness training as defined in Section 5.5.6 of the Solid Waste Regulations will be provided to workers directly involved in soil-disturbing activities on sites where there is known ACS or a "reason to believe" ACS may be encountered. The training will address such topics as history and background of asbestos, identifying types of asbestos, health effects, engineering controls, and actions to take when suspect asbestos materials are encountered. The training will be conducted with oversight and curriculum development by a currently certified asbestos building inspector, asbestos supervisor or project designer.

The awareness training will provide information necessary for the individuals to perform their duties in a way that ensures compliance with the requirements of Section 5.5 of the Solid Waste Regulations. The training will be conducted by an Asbestos Supervisor, ABI or Project Designer, certified in accordance with AQCC Regulation No. 8, Part B, and who has a minimum of six (6) months experience in asbestos-contaminated soil management.

5.3 ACS Soil Disturbance Training

Personnel overseeing, directing and/or handling ACM or ACS during soil excavation activities shall have the following minimum training:

Asbestos-contaminated soil training that provides information necessary to perform their duties in a way that ensures compliance with the requirements of Section 5.5 of the Solid Waste Regulations, including on-the-job ACS awareness training as discussed in Section 5.2 above. This training will be conducted by an Asbestos Supervisor, ABI or Project Designer, certified in accordance with AQCC Regulation No. 8, part B, and who has a minimum of six months experience in asbestos-contaminated soil management.

Training in accordance with OSHA standard 1926.1101(k)(9)(vii) is also required for those performing soil disturbing activities in an area with ACM or ACS.

This training requirement applies to equipment operators but is not required for drivers of trucks carrying contaminated material for disposal to approved landfills.

5.4 ACS Inspection, SOP Preparation, and Air Monitoring Training

Individuals performing soil inspection (for purposes of identifying suspect ACM) must have a current ABI certification in accordance with AQCC Regulation No. 8, Part B, and must have a minimum of six months experience conducting ACS inspections. When a team of ABIs are used for inspection and sampling, the team-lead inspector must have a minimum six months experience (oversight inspectors are allowed to collect bulk samples, etc without the minimum six months experience).

Individuals preparing and signing Soil Characterization and Management Plans (SCMPs) must have a current Asbestos Project Designer certification in accordance with AQCC Regulation No. 8, Part B.

Individuals performing asbestos air monitoring (alone) associated with ACS disturbing activities must have a current Air Monitoring Specialist (AMS) certification in accordance with AQCC Regulation No. 8, Part B. Air monitoring oversight can be provided by non-AMS certified staff including sample analysis, mobilization of equipment, etc.

5.5 Additional Considerations

It is the contractor's responsibility to provide training to all employees who have the potential for exposure to asbestos in the proper use of PPE and have a current annual physical with a medical release/respirator use form in accordance with the employer's medical surveillance program. Personal exposure air monitoring will be conducted in accordance with the employer's exposure assessment program.

6 Immediate and Interim Actions upon Discovery of Suspected ACM

This section describes the immediate and interim actions that will be implemented when suspected ACM or ACS is discovered. When suspected ACM or ACS is discovered during excavation activities at the project, the critical requirement is to avoid generating airborne soil or being in direct contact with contaminated soil, thereby limiting potential exposure to asbestos fibers. Field personnel shall take actions necessary to assure that the suspect material is not disturbed while waiting for appropriately trained personnel to arrive on site. DEH is available to any City department and/or City contractor as an ABI resource to implement this SOP as required.

6.1 Immediate Actions upon Discovery of Suspected ACM

The CDPHE will be notified at least 10 days prior to any planned soil disturbing activity in areas of known or suspected ACS or ACM. In the event that visible ACS or ACM in soil is discovered the Division will be notified of this discovery no later than 24 hours after discovery. The CDPHE can be notified by using the Notification Form in Appendix A of this plan and faxed to 303-759-5355 or emailed to comments.hmwmd@state.co.us. For emergency repair projects to utilities, etc., notification will be provided to CDPHE by the next business day. Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact and use of the form in Appendix A may not be necessary. Notification information for DEH is provided in Section 3.0 of this SOP. Figure 2 depicts the general procedure for Immediate and Interim Action upon Discovery of Suspected ACM.

This SOP has been prepared to minimize potential delays, and to develop approved standard procedures that the contractor or City personnel will implement as needed for applicable soil disturbing activities. These standard procedures once approved by the CDPHE, will satisfy the requirements for a SCMP.

The following outlines procedures to be followed to minimize the potential for release of airborne asbestos fibers when suspect ACM or ACS is discovered.

- Stop work immediately upon encountering material that is suspected of containing asbestos.
- Adequately wet area with water before performing sampling activities that will disturb the material (note: visual inspection does not require wetting). Maintain wet conditions throughout sampling activities. If leaving the site unattended, cover the disturbed soil with a layer of 6-mil polyethylene (poly) sheeting, or spray with magnesium chloride solution in sufficient amounts to wet the soil to prevent drying and dust generation.

- Demarcate area suspected of containing asbestos with barrier tape, or other means, and provide site access control. Access can be prevented by means of fencing or security personnel.
- Disturb soil as little as possible to perform sampling activities as described in Section 6.2.
- A layer of 6-mil poly may be used to prevent cross contamination onto clean soils during initial characterization activities by placing the poly on the ground and then placing the potentially contaminated soil directly on the poly.
- Generate no visible emissions (dust) during characterization activities.

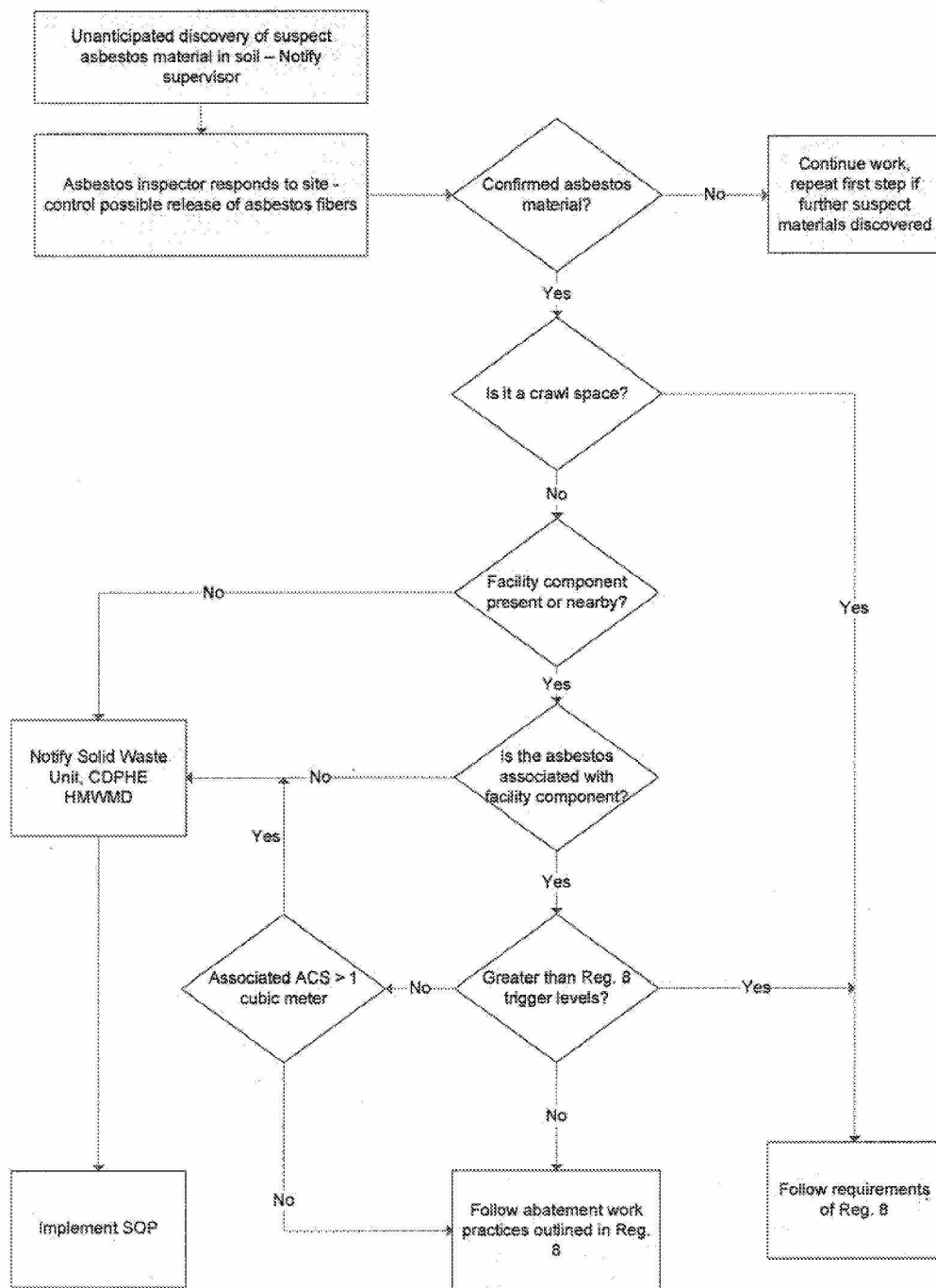
The ABI will collect samples of the suspect asbestos materials according to procedures provided in Section 6.2. The samples will be analyzed using polarized light microscopy (PLM) to identify the presence of asbestos fibers.

Clothing and equipment that has come in contact with suspect asbestos will be considered potentially contaminated until/unless analytical results indicate the material does not contain any asbestos. Workers and equipment will be decontaminated on site; dirt and debris should not leave the immediate work area. Heavy equipment will be left on site until analytical results are received unless the equipment has been decontaminated. The following procedures can be modified by the ABI based on the project scale and the potential level of exposure:

- Decontaminate workers by removing visible soil and dust with water or damp wipes or rags. Place wipes and rags in a plastic bag and label as "investigation-derived waste", "date" and "company name". If additional clothing is available, clothes should be changed and potentially contaminated clothing should be bagged separately from wipes and rags.
- Decontaminate equipment by removing gross soils and dust, then washing the equipment. Decontamination of equipment should be conducted by a certified asbestos worker wearing proper PPE. Materials used for decontamination should be bagged and labeled as above. Decontamination rinse water should be collected and filtered to five microns prior to disposal, or filtered water can be reused for wetting of asbestos-contaminated areas that will be removed. If areas where filtered decontamination water has been applied are not going to be excavated prior to drying, the surface must be covered or stabilized until excavation occurs to prevent the emissions of any asbestos fibers that were not removed during filtration. If disposal of decontamination water to the sanitary sewer is anticipated, rinse water should be filtered to five microns. Please see Section 7.4.11 of the SOP for more information regarding equipment decontamination.
- Based on analytical results of suspect materials, if asbestos is present, dispose of bags by double bagging and disposing as asbestos waste at DADS, or with ACM removed in accordance with this plan. If analytical results indicate that no asbestos is present, bags can be disposed as non-asbestos solid waste.

After confirmation of ACM or ACS by the ABI, the ABI will direct the contractor on full implementation of this SOP.

Figure 2. Unanticipated discovery of asbestos in soil flowchart



6.2 Interim Actions upon Discovery of Suspected ACM

Site characterization to identify the extent of ACM may be required to help develop the scope of work required to manage ACM disturbed in soil. Site characterization activities are described below.

6.2.1 Site Characterization

In the event that suspect ACM is visually identified by the ABI, steps outlined in Section 7.0 will be implemented. The following steps will be applied to sample and analyze suspect ACM identified by the ABI:

- Samples of suspect ACM shall be placed in appropriate sample containers such as sample bags or jars;
- Care should be taken to ensure that suspect ACM is adequately wetted to prevent visible emissions during the sampling process;
- The ABI will classify the suspect ACM as friable or non-friable;
- A field sampling form or log book entry will be maintained for each sample obtained. The form or log book entry will include the location using a hand-held GPS instrument, date and time of each sample, description of the type of material, assessment of friability of the material and other made.
- Proper chain-of-custody procedures will be followed for all samples collected.

The following analytical procedures will be followed for analysis of suspect asbestos materials:

- Samples of suspect ACM will be analyzed by a National Voluntary Laboratory Accreditation Program (NVLAP)-accredited laboratory by PLM methodology to determine if any asbestos fibers are present. Alternatively, suspect ACM can be assumed to contain asbestos rather than sample and await analytical results.

If assumed ACM is present in soil or ACM is confirmed in soil by the ABI, the ABI will direct the contractor on full implementation of this SOP.

7 Removal of Asbestos-Contaminated Soil

7.1 ACS Management Procedures

The following sections provide general ACS management procedures to be utilized when disturbing ACS. Section 7.2 describes notification procedures, Section 7.3 describes management of limited quantities of ACM and the remaining sections describe management of significant quantities of ACM (note notification to CDPHE, worker protection and proper disposal will apply to both types of discoveries). Minimum engineering controls and air monitoring will be implemented any time excavation activities are occurring in an area of Known ACS, or at a site that is classified as Reason to Believe.

7.1.1 Minimum Engineering Controls for Known or Reason to Believe Sites

Minimum engineering controls should include, but not be limited to:

- If multiple excavations are occurring simultaneously where ACM is potentially present, then multiple ABIs must be available to observe each active excavation.
- The ABI must be located or positioned to positively identify the presence or absence of suspect ACM. The ABI and equipment operator should have a means of continuously communicating with each other.
- A misting system, spray bar, or equivalent spray device should be mounted on each bucket or excavator that is disturbing debris and/or ACS to ensure that there are no emissions.
- A person with a fire hose on low pressure and equipped with a ball valve (or equivalent) will be present at the point of excavation to prevent and not cause fugitive dust emissions and potential asbestos fiber emissions to comply with the regulations.

7.2 Notifications for Planned ACS or ACM Disturbance

The CDPHE will be notified at least 10 days prior to any planned soil disturbing activity in areas of known ACM or ACS. The CDPHE can be notified by using the Notification Form provided in Appendix A, and faxed to 303-759-5355, or emailed to comments.hmwmd@state.co.us. For emergency repair projects to utilities etc., notification will be provided to CDPHE by the next business day. Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Appendix A may not be necessary.

7.3 Removal by Hand - Limited Quantity ACM Discovery Management and Disposal "Pick and Go"

If ACM or suspect ACM is encountered in soil and consists of less than 25 separate pieces of ACM in a single location that is less than 10 cubic feet (with multiple pieces of ACM within a few inches of each other to be treated as one piece of ACM), the ABI may direct the removal of these pieces of ACM using the procedures listed below:

1. Use water to adequately wet the material and surrounding soil;
2. For non-friable ACM, gather and place the ACM and several inches of surrounding soil in six- millimeter bags (double bags);
3. For friable ACM gather and place ACM and three cubic feet of surrounding soil in six-millimeter bags (double bags). Continue work with extra attention to possible additional ACM in that vicinity;
4. Stage waste bags in a lined drum or roll-off container. Identify drums or containers as solid waste that contains asbestos for disposal at DADS in accordance with CDPHE regulations and this SOP; and
5. Conduct a follow-up visual inspection of the area and repeat procedures 1 through 4 above as necessary.

All personnel involved in the removal of Limited Quantity ACM will wear at a minimum a half-face air purifying respirator with HEPA filtration, disposable protective suit, over booties and gloves. Decontamination of all tools and equipment involved in the removal of ACM is required prior to leaving the designated work area. Refer to Sections 7.4.10 and 7.4.11 of this plan for equipment and worker decontamination procedures.

7.4 Excavation and Earthmoving, Known ACS or ACM

The following subsections apply to excavation or earthmoving work in areas where ACM or ACS has been identified.

7.4.1 Site Control, Demarcation, Fencing and Wind Screening

The designated work area consists of the immediate area where ACM or ACS has been observed. The designated work area can be demarcated on all four sides using a movable/portable wind barrier to prevent wind dispersal of soil during excavation activities. Moveable/portable wind barriers can be placed on all four sides and immediately adjacent to the point of excavation, and should be of adequate height and configuration (size) to minimize wind soil dispersal at the point of excavation. For large projects with widespread removal of ACS, the requirement for the use of windbreak barriers may be modified or waived. For smaller areas or highly mobile removal activities, moveable "directional" mobile wind fencing can be used, and should be positioned upwind and adjacent to soil removal activities at all times. Where only directional wind fencing is used, asbestos barrier tape should be installed to identify the remaining boundary of the Work Area (where wind fence is not positioned).

7.4.2 Protection of Adjacent Structures

When the designated work area is close (i.e. 50 feet) to occupied structures, external barriers may need to be constructed. Exposed openings in the structure, including windows, doorways, vents or other openings should be sealed with 6-mil poly.

7.4.3 Soil Wetting and Stabilization

Soil within the designated work area will be adequately wetted to prevent any fugitive dust emissions that may be generated during initial setup and mobilization into the area. The contractor shall use water hoses from a tank truck or directly from a fire hydrant or other water source. Water will be applied at low pressure so as to not generate dust or splattering. During all soil disturbing activities, wetting of soil will be sufficient to ensure soils are adequately wet (no visibly dry soil and no visible emissions) throughout the soil disturbing activities.

7.4.4 Dust and Emissions Control

General dust control will be achieved by use of water trucks that will regularly spread water on all access roads throughout the project site to ensure no visible dust generation by vehicle traffic during soil disturbing activities.

Water will be applied for dust control within all disturbed areas. The contractor will maintain the dust control process throughout the course of the project during soil disturbing activities. Removal of soil and debris from the designated work area will be performed with heavy equipment which has been adapted to have a water misting system installed to minimize dust emissions at the point of removal. Water will be applied in a manner that does not cause run-off or splattering. In addition, a water misting system will be constructed to wet the material at the point of loading into the dumpster prior to final packaging. Additional hand wetting using a water hose equipped with a ball valve for misting will be used to eliminate fugitive emissions, but avoid splatter or drift from spraying.

Whenever ACM or ACS is disturbed, the contractor will ensure that no emissions are generated. The City's consultant will be on site to monitor the moisture of the soil being excavated to ensure that it is adequately wet (and to observe for any visible emissions). An ABI will conduct these visual inspections.

If emissions are observed during the removal process, soil disturbing activities will immediately cease and work practices will be reviewed and modified by the contractor. The consultant will log all instances where visible dust emissions occurred and immediately notify the City and CDPHE by phone and in writing, of all occurrences, and will obtain any direction from the City and CDPHE.

7.4.5 Personal Protective Equipment

During soil disturbing activities, all persons within the designated work area shall utilize appropriate PPE, as identified in OSHA's general requirements for asbestos workers (29 CFR 1910.1001). PPE shall include appropriate respiratory protection with a minimum half face respirator with HEPA filtration required anytime active soil disturbance is occurring, protective full body Tyvek[®] suit with attached hood and booties, gloves, rubber boots, and other protective wear as appropriate based on conditions (cold stress, heat stress, insects, etc).

7.4.6 Removal/Excavation

Utilizing an excavator, mini excavator or backhoe with a bucket mounted spray bar system; the soil excavation will proceed within the designated work area. The spray bar system will consist of nozzles inside the back top edge of the bucket and two outside the bucket with nozzle's spray

pattern overlapping that will eliminate fugitive dust during loading, but avoid splatter or drift from spraying. Additional hand wetting will be conducted at the point of excavation using a water hose equipped with a ball valve and nozzle for misting. The low pressure ball valve and nozzle should allow water application in an outward fan of fine spray or mist that will knock down potential fiber emissions while also preventing splattering or runoff.

Excavation of ACS will not overreach the bounds of wetting. For projects involving relatively shallow ACS occurrence, excavation will be conducted in 6-inch and 1-foot lifts to ensure that disturbed soil remains adequately wet. For projects involving ACS at depth, such as a landfill, excavation in lifts may not be practical. In these instances, wetting may take place as the excavation proceeds, with wetting being conducted using hand held low pressure hoses. The soil may be mixed within the excavation, using the excavator bucket, until it is adequately wet. The soil may then be moved from the excavation into the lined trailer. If ACM is present in the excavation side-walls or floor, the material will be wetted and stabilized with magnesium chloride if left overnight, or covered with poly sheeting if ACM in the excavation side-wall or floor will remain exposed for a longer period of time. At no time shall soil that is not adequately wet be removed from the excavation. During the removal process, all areas of impact will be kept adequately wet. Water will be applied at low pressure so as not to generate dust or splattering and will be applied at the point of contact. The excavator will handle the material wet and direct load the soil into a tractor trailer or end dump.

Poly sheeting will be placed over uncontaminated soils in the swing radius of the excavator and along the transport route of loading equipment to prevent cross-contamination. Care will be taken to avoid contamination of the excavating equipment. This will be accomplished by driving and keeping excavating equipment on non-contaminated soil.

If the excavating equipment has to be placed on contaminated soil, the soil will be covered with 6-mil poly to avoid contamination of the rig. If the rig is driven over contaminated soil, the soil will be adequately wetted to avoid air emissions. Equipment that comes in contact with contaminated soil, or that was within the designated work area will be decontaminated. Conduct work with appropriate phasing/sequencing that will minimize cross-contamination potential.

7.4.7 Soil Stockpiling

Stockpiling of ACS will only occur under CDPHE and City approval, as removal of ACS should be under a direct load approach whenever possible. When soil movement and stockpiling is necessary, stockpiled ACS must be stabilized and covered when not in use and must not be allowed to remain on site longer than 5 working days.

7.4.8 Truck/Container Staging/Lining and Waste Loading

All truck drivers will be instructed to close all windows and shut off air delivery systems (fans on air-conditioning and heating systems) when entering the loading area. All travel and positioning of waste transport truck/trailers should be on visually verified clean soil to minimize the need for decontamination procedures. At the loading location, a 10-mil poly sheeting or thicker "lay-down pad" will be placed on the ground under dumpsters/trucks to catch any spilled material. Spilled ACM or ACS will be cleaned up immediately and not allowed to dry out or accumulate. Additional poly can be draped over trailer tires/fenders to minimize the need for

decontamination after loading. After the load has been secured and load cover tarp is installed, the poly sheeting lay down loading pad will be properly decontaminated prior to the truck moving forward, using wet methods such as hoses and brooms and squeegees.

7.4.9 Waste Transportation and Disposal

Containers of non-friable ACM, soil with visible non-friable asbestos or ACS with no visible asbestos will be managed in accordance with the requirements of Section 5.5.7 (B) and 5.2 of the Solid Waste Regulations. In accordance with the disposal requirements for non-friable ACM at least one 6-mil poly liner will be in trucks used for transport of soil that contains visible non-friable ACM. Poly liners should be designed and sized for the container to be used and should be folded over sides of trailers and containers to protect against contamination during loading and to facilitate decontamination. After loading, the liners will be sealed so that it remains leak-tight during transportation and disposal operations. Containers of non-friable ACM and soil shall be labeled with "asbestos, danger", the name of the generator, and placed on top of sealed liner.

Containers of friable ACM, or soil with visible friable asbestos, shall be labeled, in accordance with the requirements of Section 5.3 of the Solid Waste Regulations. The disposal requirements for friable asbestos waste (Section 5.3.5(A) of the Solid Waste Regulations) require that at least two 6-mil poly liners be used to encapsulate soil that contains visible friable asbestos. Poly liners should be designed and sized for the container to be used and should be folded over sides of trailers and containers to protect against contamination during loading and to facilitate decontamination. After loading, both liners should be sealed separately. The liners shall be sealed so that they remain leak-tight during transportation and disposal operations and labeled in accordance with Section 5.3.5(B) of the Solid Waste Regulations.

In addition, DOT asbestos placards shall be placed on all four vertical sides of the container or vehicle being used for transport of ACM and ACS. The contractor should direct the schedule of transportation of asbestos-contaminated soil. When loaded, each truck will be assigned a manifest to serve as the shipping document for that particular load.

ACM or ACS shall be transported and disposed in a leak-tight container in accordance with the CDPHE disposal requirements. Documentation stating that the ACM or ACS originating from the site will not be used as daily cover or sold as clean fill shall accompany each load of ACM or ACS removed from the site.

Disposal of ACM or ACS will be conducted as follows in accordance with Section 5.5.7 of the Solid Waste Regulations:

1. ACS containing visible friable asbestos will be disposed in a leak tight container as friable asbestos waste in accordance with the requirements of Section 5.3 of the Solid Waste Regulations.
2. ACS containing only visible non-friable asbestos, that has not been rendered friable, will be disposed of as non-friable asbestos in accordance with Section 5.2 of the Solid Waste Regulations.
3. ACS containing no visible asbestos will be disposed in a manner similar to non-friable asbestos waste, as described in Section 5.2 of the Solid Waste Regulations.

7.4.10 Personnel Decontamination

At the beginning of each work day workers who will be in the area of active ACS disturbance will don disposable protective suits (Tyvek), disposable gloves and disposable boot covers (excluding truck drivers). For most projects, worker decontamination will consist of removal of the Tyvek suit, gloves, and boot covers, which should then be containerized and disposed as asbestos waste. Any non-disposable personnel items must be decontaminated with water or wet wiping.

During all soil-disturbing activities in areas with friable asbestos, a fully functioning decontamination unit or trailer can be available onsite for worker decontamination as specified by the contractor's HASP. The decontamination unit will be centrally located among investigation areas and will consist of three chambers with operational hot and cold running water for the shower. The decontamination unit may be utilized by the workers each time they exit the work area. All contaminated disposable personnel protective equipment shall be containerized and disposed as asbestos waste. Water from the decontamination unit will be filtered to 5 micron and disposed of in the sanitary sewer.

7.4.11 Equipment Decontamination

All equipment and tools that come into contact with, or are used for removal of ACM or ACS will be decontaminated (free of all visible dust and debris) using wet cleaning methods, prior to leaving the work zone. Equipment decontamination can occur in areas of asbestos-contaminated soil or within a decontamination station. If decontamination occurs over asbestos contaminated soil the area will be kept wet or stabilized and soil in the area will subsequently removed for disposal. Alternatively, equipment decontamination will be conducted within a decontamination station constructed adjacent to the work zone. The decontamination station will be constructed of 10-mil poly sheeting (and other materials as necessary, such as ethylene propylene diene monomer [EPDM] rubber roofing, etc) in such a way as to capture all contaminated material and wastewater from the decontamination process. All wastewater from the decontamination station will be filtered to a minimum of 5-microns prior to use as wetting water for an area of ACS that subsequently will be removed or discharge to a sanitary sewer.

7.5 Wind and Work Stoppage Conditions

ACS disturbance operations will not be conducted if winds produce visible emissions of dust or create dust when moving equipment or soil. All wind speed measurements will be taken at locations in close proximity to, and representative of, the designated work area in which the ACS is being handled. Wind speed measurements will be recorded at least every 30 minutes and during wind gusts by an AMS. This frequency will be increased at the AMS's discretion when it has been determined that wind conditions may be approaching threshold limits. It will be the responsibility of the AMS to take and record all wind speed measurements onto the daily logs.

Shutdown conditions: ACS removal/disturbance operations will immediately and temporarily cease when one or more of the following conditions have been met:

1. Any wind gust reaching or exceeding 20 mph as determined by hand-held instruments;

2. Sustained wind speeds reaching or exceeding 12 mph averaged over a period of 10 minutes;
3. Winds are producing visible emissions or creating movement of dust or debris in or near the removal/disturbance area; or
4. Winds are impacting the ability of engineering controls to work as designed.

During wind-related work shutdowns, other work activities not involving soil removal or disturbance (e.g., lining dumpsters) may continue.

Resume Conditions: ACS disturbance activities may resume after all of the following conditions have been met:

1. All wind gust readings for a period of 20 minutes drop below 20 mph as determined by hand-held instruments;
2. Sustained wind speeds are below 12 mph averaged over a period of 20 minutes;
3. Winds are no longer producing visible emissions or creating movement of dust in or around the removal/disturbance area; and
4. Winds are not impacting on the ability of engineering controls to work as designed.

7.6 Air Monitoring Requirements Associated with Engineering Controls

During soil disturbing activities in areas of known ACS or where there is reason to believe ACM or ACS may be encountered, the AMS will collect air samples to assist in determining the adequacy of the engineering and environmental controls employed at the site. The daily air monitoring sampling scheme, monitoring type, sample frequency, duration and analysis are listed in Table 1. Progressive air monitoring will be implemented when excavation activities are occurring in a fill area in which one can expect to encounter ACM or ACS even prior to identification of ACM and when suspect ACM has been observed. All air samples will be collected by an AMS. Depending on the size of the work area and the type of soil being removed, air monitoring may include personnel air monitoring only, or personnel monitoring and perimeter air monitoring for large open areas. In general, personnel air monitoring only (i.e., no perimeter monitoring) shall be used when disturbing no more than a 100 x 100 foot area at a time. Where only personnel air monitoring being performed, personnel air monitoring must be in an area representative of the designated work area. However, if the work area is proximate to occupied buildings residential homes, or areas of public access perimeter air monitoring may be necessary even if the work area is smaller than 100 x 100 feet, in order to demonstrate that no asbestos fibers have left the work area.

7.6.1 Personal Air Monitoring Associated with OSHA

It is the contractor's responsibility to ensure that personal air monitoring shall be performed in accordance with all OSHA requirements and the site Health and Safety Plan during disturbance of known and suspect asbestos in soil. In addition to OSHA requirements, for all ACS excavation activities, at least two different workers or 25 percent of the workers, whichever is greater, and who are expected to have the worst-case exposure to asbestos during excavation shall be monitored to assist in determining the adequacy of engineering and environmental controls employed at the site.

7.6.2 Perimeter Air Monitoring

Generally, perimeter air monitoring will be performed during excavation of greater than 100 x 100 feet of disturbances of ACS. Perimeter air monitoring may be required in smaller excavations where friable ACM exists and soil disturbance occurs immediately adjacent to sensitive receptors such as occupied buildings, residential homes or areas of public access or if personnel monitoring is not representative of the work area.

7.6.3 Air Sample Analysis

Air samples shall be submitted for total fiber analysis using phase contrast microscopy (PCM) by an asbestos accredited laboratory at the end of each work day. The two samples with the highest fiber concentrations by PCM will be analyzed by transmission electron microscopy (TEM) for asbestos fibers. Table 1 summarizes the number and location of personnel and perimeter air samples and sample analysis requirements including when TEM analysis is required. Air monitoring sampling protocols are described below.

7.6.3.1 Sampling Media

Air samples will be collected by drawing air through a 25-millimeter mixed cellulose ester filter, 0.8-micron pore size, with an open-faced, long cowl using low-flow personal sampling pumps at approximately two liters per minute (or flow rate to provide a sufficient limit of quantitation/limit of detection [LOQ/LOD]). Each low-volume pump will be fitted with a computer microchip, which electronically regulates airflow and allows a fixed flow rate of air to pass over the face of the filter. The flow rate and the volume of air passed through the filter will be determined based on the National Institute for Occupational Safety and Health (NIOSH) 7400 analytical method. Each pump will be calibrated before and after the collection of each sample using a primary standard.

7.6.3.2 Sample Analysis

Sample analyses will be performed by an analyst using PCM according to the NIOSH 7400 Method. The analyst will be an AMS and a participant in the NIOSH Proficiency Analytical Testing Program and have been deemed proficient. Analyses of TEM air samples will be submitted to an accredited laboratory using TEM according to the Asbestos Hazard Emergency Response Act protocol.

7.6.3.3 Reporting

PCM verbal results will be made available by the start of the next business day or as soon as practical after the start of the next business day. TEM verbal results will be made available within 24-hours of receipt of samples by the laboratory, and written results will be made available within 24 hours from the time the verbal result is received. CDPHE will be immediately notified if any sample results show any concentration of airborne asbestos fibers. If any asbestos fibers are detected by TEM, all soil disturbance activities will be stopped and engineering controls will be evaluated by contractor and consultant, and will be discussed with City and CDPHE to determine if changes in engineering controls or additional PPE are required.

7.7 Final Inspection Procedures

As the project progresses, visual inspection will be performed to ensure that all observable ACM has been removed from the soil surface. The soil will be removed in a manner that will provide a flat, even surface (with no spoil piles) for visual inspection. The inspections will be performed for the surface area removed that day, as a preliminary inspection. Due to the wet nature of the removal and the soil, adequate drying time is required before a final visual inspection can be conducted.

The removal of soil in the debris field area will be considered complete when sufficient soil has been excavated based on construction plans.

7.8 Managing ACS left in place

Where ACM is observed at the depth and extent of excavation the area shall be covered with a geotech membrane and labeled as asbestos-contaminated soil. The geotech membrane should be covered with clean soil to protect and maintain the geotech membrane in place. Prior to covering with clean soil, photographs will be taken from each compass point of the boundary, and the corner points of the boundary shall be obtained using a GPS with sub-foot accuracy. This information will be maintained by DEH and other City departments as appropriate.

7.9 Spill Control

Where ACM or ACS is spilled during loading or transport, the contractor shall ensure the spilled ACM or ACS is immediately collected in accordance with wetting and emission control provisions of this SOP.

7.10 Erosion Control

To control wind erosion of ACM or ACS, use of silt fencing or wind fencing may be used, where appropriate. Stabilize friable ACS by covering with magnesium chloride (or equivalent soil stabilizer) or 6-mil poly until removal can occur. Securely fasten poly sheeting to prevent removal by the wind.

To control water erosion, the use of silt fencing, erosion control mats, straw waddles or equivalent erosion control methods shall be used in areas where run-off is likely. Where ACM or ACS will remain follow the procedure described above in Section 7.8.

8 Special Considerations

8.1 Importing and Exporting Soil

The contractor shall notify and receive approval from the City project manager prior to any soil being exported or imported to the site. The contractor shall coordinate any inspections, observation, or testing requested by the City project manager for any exported or imported soils to the site.

8.2 Soil Stockpiling Management Procedures

Stockpiling of ACS will only occur for waste segregation and loading, as provided in this plan. Stockpiled ACS must be stabilized and covered when not in use, and must not be allowed to remain on site longer than 5 working days.

8.3 Emergency Buried Utility Repair Projects

Specific provisions of this SOP require some planning and response time that may not be appropriate in an emergency response situation to repair a buried utility. This section identifies the minimum requirements under this SOP for the first 24 hours of excavation and repair, to ensure that necessary repairs can be made to buried utilities promptly in an emergency situation where the utility must be repaired immediately (which may include evening and weekend work). Where suspect ACM is encountered during the emergency response, only worker protection, adequate wetting and no visible emission provisions of this SOP will apply within the first 24 hours. The remaining provisions including notification to CDPHE HMWMD, material characterization, asbestos awareness training, air monitoring, disposal etc. will take effect after the first 24 hours of the excavation and repair event. Ensuring adequate wetting and no visible emissions during the first 24-hours of the emergency excavation will allow necessary work to continue and will provide a window for implementing remaining provisions of this SOP including testing of suspect materials, and where suspect ACM is identified, implementing management actions under this SOP. Suspect ACS that has been excavated during the emergency repair shall not be placed back into the hole/pit until characterization can be conducted by an ABI. Appropriate worker protection (respirator, disposable suit, gloves, etc.) shall be utilized when any suspect ACM is encountered.

9 References

- CDPHE. 2006. *Asbestos-Contaminated Soil Guidance Document*. Prepared in draft form April 2006 by the Hazardous Materials and Waste Management Division.
- CDPHE. 2006. *Asbestos-Contaminated Soil Regulations*. Section 5.5 of the Hazardous Materials and Waste Management Division's Regulations Pertaining to Solid Waste Disposal Sites and Facilities
- CDPHE. 2008, Air Quality Control Commission Regulation No. 8, Part B (5 CCR 1001-10, Part B - Asbestos).
- OSHA. *Construction Industry Standards for Asbestos*. 29 CFR 1926.110

Table 1: Air Monitoring Requirements

Excavation of Fill Areas by Mechanical Means Where There is Reason to Know or Believe ACM Could be Encountered but Prior to Identification of ACM or ACS			
Monitoring Type	Sampling Frequency	Duration	Analysis
Personal Air Monitoring	One sample per shift for each of two workers closest to disturbance activity but not inside heavy equipment	Ongoing	PCM analysis to support project air monitoring requirements. Any sample with PCM results exceeding 0.01 fibers/cc must be analyzed by TEM.
Area of Disturbance	NONE	N/A	N/A
Perimeter Sampling			
Removal by Hand or Hand-Held Equipment of Limited Quantity ACM			
Monitoring Type	Sampling Frequency	Duration	Analysis
Personal Air Monitoring	One sample per shift for each of two workers closest to disturbance activity but not inside heavy equipment	Ongoing	PCM on two workers – if analysis yields results with detectable fiber levels (based on fiber count) then submit for TEM analysis for subsequent three non friable and friable asbestos discovery events. If no asbestos fibers identified, PCM for subsequent events. Any sample with PCM results exceeding 0.01 fibers/cc must be analyzed by TEM. In the event that ACS disturbance is ongoing for multiple weeks, TEM analysis will be performed for two consecutive days every other week.
Area of Disturbance	NONE	N/A	N/A
Perimeter Sampling			
Removal by mechanical means (heavy equipment bucket, excavator, backhoe, etc) of Non-Friable ACM that has not been rendered friable			
Monitoring Type	Sampling Frequency	Duration	Analysis
Personal Air Monitoring	One sample per shift for each of two workers closest to disturbance activity but not inside heavy equipment	Ongoing	Submit personnel and perimeter samples (5 samples) for PCM analysis. If analysis yields results with detectable fiber levels

Table 1: Air Monitoring Requirements

Area of Disturbance	Two downwind perimeter samples and one upwind perimeter sample from immediate <i>Area of Disturbance</i>	Ongoing	(based on fiber count) then conduct TEM analysis on two (2) highest PCM samples to evaluate engineering controls. Any sample with PCM results exceeding 0.01 fibers/cc must be analyzed by TEM. For large areas of disturbance, additional perimeter monitoring points shall be added if the active area of soil disturbance is larger than approximately 1 acre in size. One additional monitoring point should be added for each additional 200 linear feet of perimeter (approximately 1 sample per additional ¼ acre increase in area). The AMS should place downwind floating samplers at least 50 feet from any other sample point. For active areas of soil disturbance greater than 1 acre, additional samples shall be analyzed by TEM at a minimum rate of 25% of the total number of samples collected, based on highest PCM results. However, TEM analysis is not required if PCM results are non-defect (based on fiber count).
Perimeter Sampling			

Removal of Friable ACM by mechanical means (heavy equipment bucket, excavator, backhoe, etc)			
Monitoring Type	Sampling Frequency	Duration	Analysis
Personal Air Monitoring	1 sample per shift for each of 2 workers closest to disturbance activity but not inside heavy equipment	Ongoing	Submit personnel and perimeter samples (8 samples) for PCM analysis. If analysis yields results with detectable fiber levels (based on fiber count) then conduct TEM analysis on two (2) highest PCM samples to evaluate engineering controls. Any sample with PCM results exceeding 0.01 fibers/cc must be analyzed by TEM. For large areas of disturbance, additional perimeter monitoring points shall be added if the
Area of Disturbance Perimeter Sampling	6 perimeter samples from immediate <i>Area of Disturbance</i> per day; including 4 points of compass and 2 downwind floaters	Ongoing	

Table 1: Air Monitoring Requirements

active area of soil disturbance is larger than approximately 1 acre in size. One additional monitoring point should be added for each additional 200 linear feet of perimeter (approximately 1 sample per additional ¼ acre increase in area). The AMS should place downwind floating samplers at least 50 feet from any other sample point. For active areas of soil disturbance greater than 1 acre, additional samples shall be analyzed by TEM at a minimum rate of 25% of the total number of samples collected, based on highest PCM results. However, TEM analysis is not required if PCM results are non-detect (based on fiber count).

If engineering controls are deemed to be adequate by the ABI and air monitoring specialist (AMS); *and* ongoing project air monitoring data supports this conclusion, the number and frequency of TEM and PCM analyses may be reduced following HMWM Division approval.

Appendix A

CDPHE Notification Forms

**Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
Asbestos Contaminated Soil Notification Form**

24 HOUR NOTIFICATION OF UNPLANNED ASBESTOS DISCOVERY

For 24-hour notification of the unplanned discovery of asbestos-contaminated soil, a completed copy of this form should be faxed to 303-759-5355 Attn: Solid Waste Unit Leader, or emailed to comments.hmwmd@state.co.us. If the Hazardous Materials and Waste Management Division has not pre-approved standard operating procedures that will be implemented, you must then submit a **Soil Characterization and Management Plan** to the Division for approval. If the Division has pre-approved standard operating procedures that will be implemented, you only need to submit a completed copy of this form.

The Soil Characterization and Management Plan should be mailed to: Colorado Department of Public Health and Environment, Division-B2 Attn: Solid Waste Unit Leader, 4300 Cherry Creek Drive South, Denver CO 80246-1530 or emailed to: comments.hmwmd@state.co.us.

Date and time reported:			
Contact person for entity performing soil-disturbing activity:		Phone:	Ext:
Organization, company or agency:			
Address:			
City:	State:	Zip:	
Name of property owner/operator or property representative:			
Owner/operator contact (if different):		Phone:	Ext:
Address:		Fax:	
City:	State:	Zip:	
Discovery date:		Discovery time (include AM or PM):	
Location of property: (Street address or other location description – e.g. highway mile marker)	Street Address:		
	County:	City:	Zip:
General Site Description:			
Activity resulting in discovery:			
Description of material encountered:			
Description of access or emissions controls implemented:			
Has the Division pre-approved standard procedures that will be implemented? <input type="checkbox"/> yes <input type="checkbox"/> no If "no," implement interim actions and submit a Soil Characterization and Management Plan for Division review and approval.			

**Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
Asbestos Contaminated Soil Notification Form**

10 DAY NOTIFICATION OF PLANNED ASBESTOS MANAGEMENT

For notification of planned management of asbestos-contaminated soil, a completed copy of this form should be submitted to the Hazardous Materials and Waste Management Division at least 10 working days prior to any planned soil-disturbing activity. If the Division has not pre-approved standard operating procedures that will be implemented, you must also submit a **Soil Characterization and Management Plan** to the Division for approval. If the Division has pre-approved standard operating procedures that will be implemented, then you only need to submit a completed copy of this form.

The form and plan can be mailed to: Colorado Department of Public Health and Environment, Division-B2 Attn: Solid Waste Unit Leader, 4300 Cherry Creek Drive South, Denver CO 80246-1530
or emailed to: comments.hmwmd@state.co.us.

Date and time reported:			
Contact person for entity performing soil-disturbing activity:		Phone:	Ext:
Organization, company or agency:			
Address:			
City:	State:	Zip:	
Name of property owner/operator or property representative:			
Owner/operator contact (if different):		Phone:	Ext:
Address:		Fax:	
City:	State:	Zip:	
Location of property: (Street address or other location description – e.g. highway mile marker)	Street Address:		
	County:	City:	Zip:
General Site Description:			
Description of planned soil-disturbing activities:			
Description of material that will be disturbed:			
Has the Division pre-approved standard procedures that will be implemented? <input type="checkbox"/> yes <input type="checkbox"/> no If "no," submit a Soil Characterization and Management Plan for Division review and approval.			

Appendix B

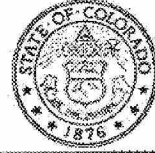
CDPHE Approval Letter and City's Responses to CDPHE Comments

STATE OF COLORADO

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Colorado Department
of Public Health
and Environment

December 7, 2010

Mr. Dave Erickson
CCOD, Department of Environmental Health
200 W. 14th Avenue, Department 310
Denver, CO 80204

RE: Final Agency Action: Approval of *Asbestos-Contaminated Soil Management Standard Operating Procedure for City and County of Denver*, dated December 3, 2010

Dear Mr. Erickson:

On December 6, 2010, the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment ("the Division") received the revised *Asbestos-Contaminated Soil Management Standard Operating Procedure (SOP) for City and County of Denver*, dated December 3, 2010. The Division has completed its review and is pleased to approve this standard operating procedure for asbestos-contaminated soil management projects in the City and County of Denver.

The Division is authorized to bill for its review of technical submittals, pursuant to 6 CCR 1007-2, Part 1, Section 1.7. An invoice for the Division's review of the subject document will be transmitted to you under separate cover. Should you have any questions regarding this correspondence, please call Cindy Smith at (303) 692-3409.

Sincerely,

Cindy M. Smith
Environmental Protection Specialist
Solid Waste and Material Management Unit
Solid and Hazardous Waste Program

cc: Charles Johnson, CDPHE
Alice Luhan, CCOD Department of Environmental Health, 200 W. 14th Avenue, Dept. 310, Denver, CO 80204
Steve Gonzales, CCOD Department of Environmental Health, 200 W. 14th Avenue, Dept. 310, Denver, CO 80204

File: SW/DNV/SOP 3.10

Department of Environmental Health, Environmental Quality
Responses to June 16, 2010 CDPHE comments on City and County of Denver
Asbestos-Contaminated Soil Management Standard Operating Procedure (SOP)
July 23, 2010 – Revised November 19, 2010

Comment 1: Page 3, Section 2.3.2, High Potential ACS, change this section heading to “High Potential ACS – Reason to Know or Believe”.

Response: The heading for Section 2.3.2 was changed to “Reason to Believe”.

Comment 2: Page 3, Section 2.3.3, Elevated Potential ACS, change this section heading to “Elevated Potential ACS – Reason to Believe.”

Response: Consistent with 6 CCR 1007-2 Regulations Pertaining to Solid Waste Sites and Facilities and in accordance with discussion among CDPHE and CCOD personnel on August 12, 2010, reference to Elevated Potential ACS (Section 2.3.3) has been eliminated from the SOP. Instead, subsections under Section 2.3 *ACS Potential Classification* are limited to “Known ACS”, “Reason to Believe”, and “No Reason to Know or Believe”.

Comment 3: Page 3, Section 2.3.3, Elevated Potential ACS, third sentence, replace the word “moderate” with “elevated” to use consistent terminology.

Response: As noted in response to Comment 2, reference to “Elevated Potential ACS” has been eliminated and the requested change cannot be made.

Comment 4: Page 3, Section 2.3.3, Elevated Potential ACS, modify the fourth sentence such that it states “Where a site has been classified as having an elevated potential to encounter ACS, an ABI will be present during soil-disturbing activities because it has been established that there is reason to believe ACS may be encountered.”

Response: The City has modified Section 2.3 (and Section 2.3.3) to read as follows:

2.3 ACS Potential Classification

Results of the environmental and historical review are used to classify the site according to the potential for asbestos to be present in soil. The classification is used to determine the appropriate level of response, characterization and management activities, if any, for a site. Figure 1 depicts the site classification system and the response actions that flow from each classification.

2.3.1 Known ACS

A site that is classified as having known ACS is one where confirmed asbestos material in the soil was identified from subsurface soil investigation or from visual observations of the surface, sidewalls, embankments, etc. Soil disturbance activities on sites with known ACS will follow the management practices outlined in Section 7.0 of this SOP. Additional site characterization, if appropriate, will be conducted according to the procedures outlined in Section 6.0 of this SOP.

2.3.2 Reason to Believe

A site that is classified as Reason to Believe is one where evidence from environmental and historical reviews indicates that ACM could be encountered. Such evidence could include the presence of buried building debris or landfills in which construction debris or ACM is believed to have been deposited.

The presence of the following materials alone would not justify classifying a site as Reason to Believe:

- Wood
- Glass
- Metal
- Gravel
- Unfinished (no surface coating) concrete slab ¹
- Brick – other than fire brick ²

Brick and concrete typically are considered to be free of asbestos and rarely or only occasionally will contain asbestos. If ACM is identified in these or other materials the appropriate management practices outlined in Section 7.0 of this SOP will be implemented during soil disturbing activities. Additional site characterization, if appropriate, will be conducted according to the procedures outlined in Section 6.0 of this SOP.

2.3.3 No Reason to Know or Believe

A site that is classified as having No Reason to Know or Believe is one where environmental and historical reviews do not identify the potential for asbestos containing materials to be on site even though waste material identified above and not typically associated with asbestos may be present.

Procedures in Section 7.0 of this SOP would not be implemented at a site classified as No Reason to Know or Believe.

Comment 5: Page 3, Section 2.3.3. Elevated Potential ACS, delete the last sentence of the paragraph.

¹ Addition of asbestos to concrete slab was not a common use of asbestos. However, manufactured asbestos and Portland cement products were common including water pipes, simulated ceramic bathroom tiles, facings of acoustical materials, electrical switchboard panels, laboratory tabletops, electrical conduits, and even smaller diameter pipes were used for purlins and trusses in wartime construction to conserve steel and lumber.

² Asbestos was historically used in the fabrication of fire brick. Asbestos containing fire brick was used around boilers and furnaces and was cemented in place with asbestos furnace cement. Today, fire brick is manufactured without asbestos and much of the older asbestos fire brick has been removed and replaced with non-asbestos fire brick. Discussion of fire brick will be included in City-provided asbestos awareness training

Response: Please see response to comment 4.

Comment 6: Page 3, Section 2.3.4: Low Potential ACS, change this section heading to Low Potential ACS – No Reason to Know or Believe.”

Response: The requested change has been made.

Comment 7: Page 4, Figure 1, last box under Low Potential, change Section “4” to Section “6”.

Response: Figure 1 was revised to reflect changes in the text as noted in response to Comment 4.

Comment 8: Page 4, Figure 1, last box under High Potential, delete current language and state that “An ABI will be present during soil-disturbing activities.”

Response: Figure 1 has been revised to reflect the response to Comment 4.

Comment 9: Page 4, Figure 1, under High Potential, add last box that contains language “If ACM is observed, implement ACS management procedures of Section 7 and Section 8.”

Response: Please see response to Comment 8.

Comment 10: Page 4, Figure 1, the boxes under “Elevated Potential” should reflect same approach and language as boxes under “High Potential” because you’ve already established a “reason to believe” that asbestos may be encountered on these sites.

Response: Please see response to Comment 8.

Comment 11: Page 6, Section 4.1, first sentence; delete “ACM” and insert ‘asbestos’.

Response: The requested change has been made.

Comment 12: Page 6, Section 4.1, delete third, fourth and fifth paragraphs. This is extraneous information that doesn’t belong in the SOP, and may confuse the reader trying to implement this procedure.

Response: The requested change has been made.

Comment 13: Page 7, Section 4.1 delete first paragraph.

Response: The requested change has been made.

Comment 14: Page 7, Section 4.1 item 2, add language to this paragraph to clarify that the subject exemption from Section 5.5 applies, unless the total quantity of asbestos-

containing material to be removed from a facility component falls below Regulation No. 8 trigger levels and the facility component is located on or in soil that will be disturbed.

Response: As requested in Comment 16 below, text from Section 4.2 in which trigger levels are discussed, has been inserted in Section 4.1.

Comment 15: Pages 7 and 8, Section 4.2, delete first, second, third, fourth, and fifth paragraphs. This is extraneous information that doesn't belong in the SOP and may confuse the reader trying to implement this procedure.

Response: Response: The requested change has been made.

Comment 16: Pages 8 and 9, Section 4.2, extract items 1, 2 and 3 from this section and insert this discussion on Page 6, Section 4.1 just below the existing first paragraph.

Response: Response: The requested change has been made.

Comment 17: Page 9, Section 4.2, delete second paragraph beginning with "Under EPA NESHAPS/CDPHE APCD regulations..." This is good information regarding Regulation No. 8 but does not belong in this which was written to address activities under Solid Waste oversight

Response: This paragraph has been retained to provide the reader with information regarding facility components that may be buried on a site.

Comment 18: Page 10, Section 5.2, modify first sentence such that it begins "On-the-job asbestos-contaminated soil awareness training..."

Response: The requested change has been made.

Comment 19: Page 10, Section 5.2, there appears to be a conflict between the first sentence in first paragraph which states that "on-the-job asbestos-contaminated soil awareness training will be provided to all workers directly involved in soil disturbing activities on soil disturbing projects, including heavy equipment operators", and the first sentence in the second paragraph which states that "on-the-job asbestos soils awareness training as defined in Section 5.5.6 of the Solid Waste Regulations will be provided to workers directly involved in soil-disturbing activities on sites where there is known ACS or a "reason to believe ACS may be encountered." Please provide clarifying language that differentiates the training discussed in these two paragraphs.

Response: The first paragraph of Section 5.2 has been revised to read as follows:

On-the-job asbestos contaminated soil awareness (ACS) training as defined in Section 5.5.6 of the Solid Waste Regulations will be provided to all workers directly involved in soil disturbing activities on soil disturbing projects, including heavy equipment operators where there is known ACS or a reason to believe ACS may be encountered. EQ is

available to any City department and/or City contractor as an ABI resource to provide the awareness training as follows:

Comment 20: Page 10, Section 5.2, third paragraph, first two sentences, replace the word "must" with "will".

Response: The requested change has been made.

Comment 21: page 10, Section 5.3, delete item 1 and item 3 from the section, as these are not training requirements. This language can be incorporated in other relevant sections of the SOP.

Response: The requested change has been made.

Comment 22: Page 10, Section 5.3, item 2, insert "as discussed in Section 5.2 above" after "on-the-job ACS awareness training" to clarify that this is the same ACS awareness training required for soil disturbance in areas with a potential for asbestos.

Response: The requested change has been made for sites classified as "Reason to Believe".

Comment 23: Page 11, Section 5.5, modify first sentence to state "CCOD will require individuals with the potential for exposure to asbestos fibers to be trained in the proper..."

Response: The City relies on its contractors to provide proper training to their employees. Accordingly, the first sentence of Section 5.5 was modified to read as follows: "It is the contractor's responsibility to provide training to all employees who have the potential for exposure to asbestos fibers in the proper usage of personal protective equipment and ensure that they have a current annual physical with a medical release/respirator usage form in accordance with the employer's medical surveillance program."

Comment 24: Page 11, Section 5.5, second sentence, replace the word "should" with "will".

Response: The requested change has been made.

Comment 25: Page 12, Section 6, delete first sentence of second paragraph and re-write to indicate that CDPHE will be notified at least 10 working days prior to any soil disturbing activities in areas of known or high potential ACS. The approved SOP does not renounce the need to notify the Department of soil disturbing projects.

Response: The first sentence was replaced with the following sentence: "The CDPHE will be notified at least 10 days prior to any planned soil disturbing activity in areas of known or suspected ACS or ACM."

Comment 26: Page 13, Figure 2, make separate boxes for the current “facility component” diamond to outline options for above trigger level and below trigger level scenarios. You may refer to the flow chart in the current CDPHE guidance document.

Response: The requested change has been made.

Comment 27: page 14, fourth paragraph, modify first sentence to state “Clothing and equipment that has come into contact with suspect asbestos will be considered potentially contaminated until/unless analytical results indicate the material does not contain any asbestos.”

Response: The requested change has been made.

Comment 28: page 14, fourth paragraph, modify third sentence to state “Heavy equipment will be left on site until analytical results are received, unless the equipment has been decontaminated.”

Response: The requested change has been made.

Comment 29: Page 14, third bullet, modify first sentence to state “Decontaminate workers by removing visible soil and dust with water or damp wipes or rags.”

Response: The requested change has been made.

Comment 30: Page 14, fourth bullet, refer to Section 7.4.11 of the SOP for equipment decontamination.

Response: The requested change has been made.

Comment 31: Page 14, fifth bullet, delete specific reference to DADS landfill

Response: Reference to DADS landfill has been retained; asbestos contaminated soil from City-funded projects must be transported and disposed of at DADS landfill.

Comment 32: Page 14, last sentence, add language acknowledging option to assume ACM and follow Section 7 of the SOP (rather than sample and await analytical results).

Response: The last sentence was revised to read as follows: “If assumed ACM is present in soil or ACM is confirmed in soil by the ABI, the ABI will direct the contractor on full implementation of this SOP.”

Comment 33: Page 15, Section 6.1 second sentence, replace the word “site” with “soil”.

Response: The requested change has been made.

Comment 34: Page 15, Section 6.1, first paragraph, the first and second sentence appear to contradict each other. If the point is to look for ACM the ABI should be there all the time. Please clarify and re-write.

Response: The first paragraph of Section 6.1 (now 6.2) has been revised to read as follows:

“6.2 Interim Actions upon Discovery of Suspected ACM

Site characterization to identify the extent of ACM may be required to help develop the scope of work required to manage ACM disturbed in soil. Site characterization activities are described below.

6.2.1 Site Characterization

In the event that suspect ACM is visually identified by the ABI, steps outlined in Section 7.0 will be implemented. The following steps will be applied to sample and analyze suspect ACM identified by the ABI:”

Comment 35: Page 15, Section 6.1, immediately following second sentence, insert language stating “per Section 5.2 of this SOP, all workers will have asbestos awareness training and if debris is identified, the ABI will be called.”

Response: Section 6.1 has been revised and is now Section 6.2. Also, please see response to Comment 34.

Comment 36: Page 15, Section 6.1, first paragraph, third sentence, delete specific reference to DADS and replace with “an approved disposal facility”.

Response: Please see response to Comment 31.

Comment 37: Page 16, Section 7.1, first paragraph, last sentence, include “Elevated Potential.”

Response: The last sentence was modified to read: ” Minimum engineering controls and air monitoring will be implemented any time excavation activities are occurring in an area of Known ACS, at a site that is classified as Reason to Believe.”

Comment 38: Page 16, Section 7.1.1, modify fourth bullet to state “ A person with a fire hose on low pressure and equipped with a ball valve (or equivalent) will be present at the point of excavation to prevent and not cause fugitive dust emissions and potential asbestos fiber emissions...”

Response: The requested change has been made.

Comment 39: Page 16, Section 7.2, modify this section to provide for a 10-day notice to the Department, as discussed in comment #25 above, or delete. Notification is discussed in Section 7.4; therefore, Section 7.2 is unnecessary.

Response: Text in Section 7.4 regarding notification was moved to Section 7.2. The first sentence of Section 7.2 reads as follows: "The CDPHE will be notified at least 10 days prior to any planned soil disturbing activity in areas of known ACM or ACS".

Comment 40: Page 17, Section 7.4.1, add language to this section explaining that, for large projects with widespread removal of ACS, the requirement for the use of windbreak barriers may be modified or waived

Response: The following sentence was added to Section 7.4.1: "For large projects with widespread removal of ACS, the requirement for the use of windbreak barriers may be modified or waived."

Comment 41: Page 18, Section 7.4.4, third paragraph, second sentence, please clarify that an asbestos soil inspector will perform this function.

Response: In Section 7.4.4, third paragraph, second sentence, the words "The Consultant" were replaced with "An ABI".

Comment 42: Page 18, Section 7.4.6, first paragraph, second sentence, delete the words "provide adequate wetting to".

Response: The requested change has been made.

Comment 43: Page 18, Section 7.4.6 first paragraph, second sentence, add the words "during loading" immediately following eliminate fugitive dust.

Response: The requested change has been made.

Comment 44: Page 19, Section 7.4.6, regarding second paragraph, first sentence, it has been the Division's observation that it is not always practical to remove soil in lifts during deep excavation projects. Add a paragraph to Section 7.4.6 that addresses wetting for deeper excavations. You may choose to borrow language from the following excerpt:

Excavation equipment will be fitted with a spray bar to contain any emissions inadvertently generated during the removal process, as well as a hand held misting system/water spray at the excavation point to ensure adequate soil wetting. Excavation of asbestos-contaminated soil will not overreach the bounds of wetting. For projects involving relatively shallow ACS occurrence, excavation will be conducted in 6-inch and 1-foot lifts to ensure that disturbed soil remains adequately wet. For projects involving ACS at depth, such as a landfill, excavation in lifts may not be practical. In these instances, wetting may take place as the excavation proceeds, with wetting being conducted using hand held low pressure hoses. The soil may be mixed within the excavation, using the excavator bucket, until it is adequately wet. The soil may then be moved from the excavation into the lined trailer. At no time shall soil that is not adequately wet

be removed from the excavation. During the removal process, all areas of impact will be kept adequately wet with amended water. Amended water will be applied at low pressure so as not to generate dust or splattering and will be applied at the point of contact. The excavator will handle the material wet and direct load the soil into a tractor trailer or end dump.

Response: Portions of the second paragraph of Section 7.4.6 were replaced with the excerpted language provided in Comment 44.

Comment 45: Page 19, Section 7.4.8, modify third sentence to state "At the loading location, a ten-mil polyethylene sheeting or thicker lay-down pad will be installed on the ground under dumpsters/trucks to catch any spilled material."

Response: The requested change has been made.

Comment 46: Page 19, Section 7.4.8, modify sixth sentence to state "After the load has been secured and load cover tarp is installed, the poly sheeting lay down loading pad will be properly decontaminated prior to the truck moving forward, using wet methods such as hoses and brooms and squeegees."

Response: The requested change has been made.

Comment 47: Page 19, Section 7.4.9, modify first sentence to state "Containers of non-friable ACM, or soil with visible non-friable asbestos, will be labeled in accordance with the requirements of Section 5.5.7 (B) and 5.2 of the Solid Waste Regulations.

Response: The requested change has been made.

Comment 48: Page 20, Section 7.4.9, second paragraph last sentence, add language "and labeled in accordance with Section 5.3.5(B) of the Solid Waste Regulations."

Response: The requested change has been made.

Comment 49: Page 20, Section 7.4.10 Personnel Decontamination, the proposed approach to personnel decontamination may be more costly and laborious than necessary. Specifically, workers are not required to wear double suits and CDPHE Regulation No. 8 requirements don't apply to outdoor asbestos-contaminated soil projects. You may choose to borrow worker decontamination language from 9.2 of the RTD SOP:

During all soil-disturbing activities in areas with friable asbestos, a fully functioning decontamination unit or trailer shall be available onsite for worker decontamination. The decontamination unit will be centrally located between the investigation areas. The decontamination unit will consist of three (3) chambers and has fully operational hot and cold running water for the shower. At the beginning of each day workers that will be in the area of active ACS disturbance will don disposable protective suits (Tyvek), disposable gloves and

disposable boot covers (excluding truck drivers). For most projects, worker decontamination may consist of removal of Tyvek suit, gloves, and boot covers, which should then be containerized and disposed as asbestos waste. Any non-disposable personnel items must be decontaminated with water or wet wiping. The decontamination unit, as indicated in the Contractors Health and Safety Plan, may be utilized by the workers each time they exist the work area. All contaminated disposable personnel protective equipment shall be containerized and disposed as asbestos waste. Water from the decontamination unit will be filtered to 5 micron and disposed of in the sanitary sewer.

Response: The first paragraph in Section 7.4.10 was replaced with the suggested worker decontamination language from 9.2 of the RTD SOP.

Comment 50: Page 21, Section 7.4.11, Equipment Decontamination, you may want to delete the reference to HEPA vacuuming methods and just cite decontamination via wet methods using hoses, brooms and squeegees. Generally, it is not practical to use a high efficiency particulate air (HEPA) filter equipped vacuum to decontaminate heavy equipment used for excavation purposes in the outdoor environment.

Response: Reference to HEPA vacuuming methods was removed from Section 7.4.11.

Comment 51: Page 21, Section 7.4.11, Equipment Decontamination, while full utilization of a decontamination station will often be necessary, you might add language that contemplates instances where decontamination can occur over areas of asbestos-contaminated soil, as long as the area will be kept wet, or stabilized, and the area is identified for subsequent removal.

Response: The following text was inserted to Section 7.4.11 immediately following the first sentence: "Equipment decontamination can occur in areas of asbestos-contaminated soil or within a decontamination station. If decontamination occurs over asbestos contaminated soil the area will be kept wet or stabilized and soil in the area will subsequently removed for disposal. Alternatively..."

Comment 52: Page 21, Section 7.5, first paragraph, modify third sentence to indicate that wind speed measurements will be recorded every 30 minutes and during gusts.

Response: The requested change has been made.

Comment 53: Section 7.6, Air Monitoring, add clarifying language to the sixth or seventh sentence stating that "in instances where personnel-only air monitoring is being performed (no perimeter monitoring), personnel monitoring must be representative of the work area."

Response: The requested change has been made.

Comment 54: Page 22, Section 7.6.2, add a sentence that contemplates the fact that perimeter monitoring may be necessary for soil-disturbing projects with areas-of-disturbance even smaller than 100 x 100 feet. For example, in smaller areas where known friable ACM exists and soil disturbance is occurring immediately adjacent to sensitive receptors such as occupied buildings, residential homes, or areas of public access.

Response: Section 7.6.2 was revised to the following: "Generally, perimeter air monitoring will be performed during excavation of greater than 100 x 100 feet of disturbances of ACS. Perimeter air monitoring may be required in smaller excavations where friable ACM exists and soil disturbance occurs immediately adjacent to sensitive receptors such as occupied building, residential homes or areas of public access."

Comment 55: Page T-1, Table 1: Air Monitoring Requirements, modify the first table heading such that it reads "Excavation by Mechanical Means in Areas where there is Reason to Know or Believe that ACM will be encountered".

Response: The requested change has been made.

Comment 56: Page T-2, Table 1: Air Monitoring Requirements, under heading Removal of Friable ACM by mechanical means (heavy equipment bucket, excavator, backhoe, etc), please re-format columns to make table more readable.

Response: The requested change has been made.

Comment 57: Page T-3, last sentence, delete the language "SOPs may contain language specifying that "and "based on methodology describe in the approved SOP."

Response: The requested change has been made.

